Tribhuvan University

Institute of Science and Technology

Bachelor of Science in Computer Science and Information Technology

Second Semester

Course Title: Data Structure and Algorithms (CSC 154)

Credit hours: 3

Full Marks: 60+20+20

Pass Marks: 24+8+8

Micro-Syllabus

S.No.	Unit	Hours	Total Hours	Marks
1.	Concept and Definition an Data Structures a. Information and its meaning b. Array in C c. The array as an ADT d. One dimensional array e. Two dimensional array f. Multi-dimensional array g. Structure h. Union i. Pointer	4	4	5
2.	Algorithm a. Concept and Definition b. Design of algorithm c. Characteristic of algorithm d. Big O notation	2	2	3
3.	The Stack a. Concept and Definition Primitive Operations Stack as an ADT Implementing PUSH and POP operation Testing for overflow and underflow conditions b. The Infix, Postfix and Prefix Concept and Definition Evaluating the postfix operation Converting from infix to postfix c. Recursion Concept and Definition Implementation of: Multiplication of Natural Numbers Factorial Fibonacci Sequences The Tower of Hanoi	3	8	11
4.	Queues a. Concept and Definition b. Queue as an ADT c. Implementation of Insert and Delete operation of: • Linear Queue	1 2	4	5

	2: 1.2			
	Circular Queue	4		
_	d. Concept of Priority Queue	1	6	
5.	Linked List		Ь	8
	a. Concept and Delating nodes	1		
	b. Inserting and Deleting nodes	1		
	c. Linked implementation of a stack (PUSH/POP)	2		
	d. Linked implementation of a queue (Insert/Remove)e. Circular List	2		
		2		
	Stack as a circular list (PUSH/POP)			
	Queue as a circular list (Insert/Remove) f Double Linked List (Insert/Remove)	1		
	f. Doubly Linked List (Insert/Remove)	1	7	9
6.	Tree		'	9
	a. Concept and Definition	4		
	b. Binary Tree	1		
	c. Introduction and application	4		
	d. Operation	1		
	e. Types of Binary Tree			
	• Complete			
	• Strictly			
	Almost Complete	1		
	f. Huffman algorithm	1 2		
	g. Binary Search Tree	2		
	• Insertion			
	• Deletion			
	Searching	2		
	h. Tree Traversal	2		
	Pre-order traversal			
	In-order traversal			
	Post-order traversal			
7.	Sorting		5	7
	a. Introduction	2		
	b. Bubble Sort			
	c. Insertion			
	d. Selection	2		
	e. Quick			
	f. Merge			
	g. Comparison and Efficiency of sorting	1		
8.	Searching		5	7
	a. Introduction	2		
	b. Sequential Searching			
	c. Binary Search	2		
	d. Comparison and Efficiency of Searching			
	e. Hashing	1		
	 Probing (Linear and Quadratic) 			
9.	Graph		4	5
	a. Introduction			
	b. Representation of Graph	1		

• Array		
Linked List		
c. Traversal		
Depth First Search	2	
Breadth First Search		
d. Minimum Spanning Tree		
Kruskal's algorithm	1	

Text Book:

Data Structures using C and C++, Y. Langsam, M.J. Augenstein, A.M. Tenenbaum

Reference Book:

The Design and Analysis of Algorithm, Nitin Upadhyay, SK Kataria & Sons

Prerequisite: C